practicable, owing to the expense involved. Until instructed to the contrary, I shall pass from India without detention arsenic cured hides. Wool from India will be subject to a thirty days' detention here until orders to the contrary are received. Little freight has as yet appeared from Mediterranean ports, figs and cured goatskins being the only articles shipped to date and originating in Smyrna.

Further data as to persons and things shipped to the United States from this port will be transmitted to the Bureau as acquired.

Respectfully,

H. S. MATHEWSON,
Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,
U. S. Marine-Hospital Service.

Report from Southampton.

SOUTHAMPTON, ENGLAND, *January 5, 1900.*

SIR: I have the honor to transmit herewith the weekly sanitary report for the week ended December 30, 1899: In this connection I have the honor also to report that influenza is reported as prevailing over much of the south of England, though this port so far has escaped. Portsmouth, 30 miles east from this place, seems to have suffered most, the death rate changing from 26 to 40 in one week. I have been unable to learn the total number of cases.

Respectfully,

W. C. HOBDY,
Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,
U. S. Marine-Hospital Service.

FRANCE.

Work at the Pasteur Institute.

PARIS, FRANCE, *December 24, 1899.*

SIR: I have to state for your information that besides my other duties at this institute I have conducted some experiments with the purpose of determining the influence of reduced temperatures upon the natural infectivity of the bacillus icteroides when administered to white mice, these animals being the most easily caged for such purposes, and being most highly reactive to this organism.

Prior to the advent of winter weather in this city, the exhibition of this organism on pure culture, either subcutaneously, intravenously, or intraperitoneally, always gave results denoting the virulence of the organism unimpaired. However, with the advent of cold weather in November, it was found that either the bacillus was becoming attenuated or that certain antiserums with which I was working were more potent, the animals receiving such serums withstanding the germ, the controls still succumbing. When, on December 5, the temperature was decidedly reduced, I inoculated 6 guinea pigs subcutaneously with 1 c. c. each bouillon culture b. of icteroides, 4 of them having, during the preceding week, received from 12–15 c. c. each of serum anticoli (Lesage). From this date until the 11th the weather was quite cold, and the cage containing the animals was kept in the laboratory room at about 60° F. On the 11th all the animals were well, excepting small abscesses at point of inoculation in the vaccinés, and hard, sharply defined areas in the subcutaneous tissue of the controls. This condition being unusual, I placed the cage for one night in the incubator at 35° C., and

removed it the next morning, placing it in another room at 25° C., from which it was removed on the 13th. One control succumbed during night of the 12th, and was devoured by the others. Therefore, it is assumed that with the elevation of temperature this animal succumbed, the others remained well.

During this intensely cold weather I exposed 2 mice to bacillus icteroides in their groins, and placed the cage at 25°C. Also 4 others to the same organism, the bouillon tube being equally divided between the 2 cages, and placed this cage at laboratory room temperature, or about 18°C. One mouse in the elevated temperature died in eight days and nine hours from time of exposure, the other died in twelve days and ten hours; the first being the nearly normal period of the disease, the last unusually long. The animals in the colder atmosphere of the room remain at this date well, the exposure commencing on the 11th, while the 2 were not exposed in the elevated temperature until December 14. Other observations are under way.

Our epidemiologic knowledge of yellow fever has been to the effect that cold weather stops the disease invariably, and this well-established fact has been made use of by Novy (*a*) to strenuously oppose the claim of Sanarelli, which my researches have now made mine also, that the bacillus icteroides is the cause of this malady. The possible recrudescence of the disease in the the following summer has been noted so recently as 1897 and 1898, and can but be taken as proof of the attenuation of the specific cause of the disease, the microorganism not having been exposed to a temperature sufficiently low to destroy its power of reproducing the disease in man. The well-known variations in the daily reports of new cases during the final days of an epidemic, the number declining rapidly after and during cool weather, again to increase with the increase of the temperature, and finally ending with the advent of temperatures continuously below 40° F., indicate the attenuation of the organism to a degree just below that at which it can infect.

My experience thus far is that the organism is innocuous to the most susceptible of all animals, mice, at 15–18° C., but that at a temperature of 25–30° C. these animals succumb in about the same period of time as did those with which I experimented in the tropics.

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The determination of the true clinical character of the pest, through the researches of the Oporto commission under the direction of M. Chalmette of the Institut Pasteur, has contributed largely to our knowledge not only of this dread disease, but also to our general knowledge of the nature of infection and resistance. The discovery that natural infections with pest take place by way of the respiratory tract, where the primary localization takes place, and that the septicæmia in such cases is *secondary*, is closely confirmatory of the conclusions drawn by your Havana commission earlier in the year.

From a case dead of the pest in Vienna, Austria, there has been isolated a pest bacillus which materially differs from others at hand here, in that it has lost its toxicity and septicity, for when placed under the skin of mice in the doses usually fatal to these animals it produces no reaction whatever, nor does it produce reaction when introduced into the peritoneal cavity. However, when this same bacillus is touched to the mucosa of the nose of the mouse it succumbs in due season, exhibiting a general septicæmia, the germ regaining its pristine viru-

a Medical News, New York, September 10 and 17, 1898.

lence of septicity after several continuous passages through mice. The quality of virulence in an organism may be of two kinds, either toxic or septic, the virulence of the former being independent of the presence of the latter, and vice versa. In pest, the virulence is mainly, if not purely, septic; at least the fulminant cases are not well marked, and death usually takes place in consequence of a general blood invasion.

Yet this power to produce sepsis in mice seems to have been completely lost, in the special culture from Vienna, when introduced artificially, thus seemingly determining the fact that besides the qualities of toxicity and septicity which it has lost, this germ possesses a third, the power to infect white mice when exposed to it naturally, or the quality of infectivity. These do not depend upon each other, although it has been generally observed that those pathogenes that are extremely toxic are nonseptic, such as the bacillus diphtheriæ, and that of tetanus; while those extremely septic are not so markedly toxic and although there is no well-marked type of this latter class, bacillus pestis produces almost invariably a sepsis, either of the blood, or the lymph in its channels.

It is quite different with the bacillus icteroides, which at times develops an overwhelming toxicity to the exclusion of sepsis, producing those anatomic changes common to the acute intoxications, such as the fatty degenerations, in marked degree, while at others the septicity is most marked, and the anatomic changes are found to be those of the septic diseases, such as (pest and typhoid fever) the areas of necrosis in the organs and the usually enlarged spleen.

To this quality, septicity, in the bacillus icteroides are due those cases which at necropsy present more the appearance of enteric fever than the classic picture of yellow fever. Furthermore, should there exist any preceding disease productive of anæmia, such as chronic malaria, the anatomic appearances may readily yield to such influence, the organs showing no typical fatty changes, but, as said above, only those of *necrosis;* this fact having been observed in the cases of anæmic animals intoxicated with phosphorus, that anæmia contradetermines fatty degeneration.

My attention has also been attracted to a para-colon organism (Lesage) isolated in pure culture from the body of an infant dead from cholera infantum. Peculiarly the entire body, its tissues and fluids, was a culture medium of the one germ, none other being found even in the alimentary contents. This organism, when kept on tube media, is naturally infective to mice in about 50 per cent of cases, but when the intestinal contents of a mouse dead from it is mixed with the food of new mice it is invariably fatal. Moreover, the anatomic appearances are strikingly similar to those from b. icteroides, and its cultural and biologic characteristics are much the same.

The only difference I have observed casually is the presence of the colon film on the surface of bouillon. This germ, however, kills mice at the cold-room temperatures, thus not being influenced by cold, as is the case with b. icteroides. That the bacillus coli communis is materially changed under certain conditions, as when it is injected into and allowed to multiply in the spleen of the dog, or (as possibly) in the cases of cholera infantum, there is no doubt, and in the latter cases it becomes not only toxic but septic also, invading the entire body. The change in this organism from the innocuous denizen of alimentary canal, or lung, into a toxic and septic germ is finally followed by it assuming the quality of infectivity, which it may, and does, lose again when kept on artificial media. From these observations, there must arise the ques-

tion, "are the nearly allied (to colon) organisims, bacillus typhi, b. choleræ suis, American, and Hungarian, bacillus peripleuro-pneumoniæ of calves, b. icteroides, derived from an original colon; are these germs possibly retrogressive into the common colon?" As an honored confrère has suggested to me, "is the bac. icteroides a colon become habituated to high temperatures in southern or tropic countries?"

From a rather intimate association with the bacillus icteroides, I am inclined to doubt that its specificity is a quality derived from heat, else all hot countries would readily generate "de novo" cases of yellow fever which would thus become endemic in them. The endemic of yellow fever, "sans jeune," in French Algeria is difficult of explanation, save that it was an infection with a para-colon—not with bacillus icteroides. Bacillus icteroides is more readily classed with bacillus pestis in its having to perfection the eminent qualities of toxicity, septicity, and infectivity unchangeable, so far as we now know, except by reduced temperatures, the ultimate fate of the attenuated germ being beyond our knowledge.

Respectfully,

EUGENE WASDIN,
Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,
U. S. Marine-Hospital Service.

Report from Havre.

HAVRE, FRANCE, *January 5, 1900.*

SIR: I have the honor to report that, as already reported to the Bureau, I arrived at this port December 26, 1899, and called at the United States consulate in order to take up my duties in connection with that office. In the absence of Mr. Thackara, United States consul, I was received by Mr. J. P. Beecher, vice-consul, who gave me a most cordial reception and has done everything in his power to put me on a pleasant footing with those I shall have to meet in the execution of my duties.

As preliminary to entering upon my duties, I called with Mr. Beecher upon M. Nicolle, commissaire d'emigration, and upon the director of the French Line, M. Boyer, and his assistants, including Dr. Martin-Dupont who is medical director and has charge of all the medical and sanitary work of the line. All received me very graciously.

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From the consular records I learn that at present all the passengers leaving this port sail by the French Line (Compagnie General Trans-Atlantique), which sails every Saturday, and carries each week from 200 to 800 steerage; at this season of the year rather nearer the former than the latter number. These passengers can be divided for our purposes into 2 groups, viz, those from beyond Marseilles and collected at that city, and those from this side of Marseilles; generally, from various points in France or Switzerland. The latter are ticketed from many points but always near their homes and from a general district known to be healthy; the former, over half are all ticketed from Marseilles, or some point in Italy.

Those from Marseilles, possibly a fourth or fifth of the total number, are almost all from the Orient, chiefly Syria, Turkey, and Armenia. From their uncertain origin these passengers are a danger in so far as plague is concerned, but owing to the time that necessarily elapses before embarking, on account of these people coming to Marseilles by